

PORTABLE SUNSHADE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates to a sunshade in the form of an umbrella, and in particular to a portable sunshade capable to move around to various locations with relative ease.

2. Relevant Art

[0002] Sunshades are known in the art. Most sunshades, at least or the large variety, are relatively stationary and require a heavy base to support the umbrella like cover or canopy that most of them conventionally use. Sunshades are used around pools, at the beach and elsewhere in tropical countries, in particular, to block out the rays of the sun during the heat of the day.

[0003] A typical sunshade comprises a large cover or canopy, supported by a frame consisting of movable struts or ribs, connected to a boom which can be tilted at various angles around a stationary support or pole. The pole is typically mounted in a heavy cement block at its lower end or base, so that in high winds the sunshade does not tip over and injure those who may be sitting under it. Thus, up until now, a large sunshade has been, out of necessity, more or less stationary.

[0004] There is a need, however, for large portable sunshades, which can be moved around with ease. Campers, and travel trailer owners, in particular, would like to have a sunshade which can be moved around, set up and torn down, without a lot of hassle. Camping is a popular pastime and sunshades are definitely useful in open areas where there is little if any shade.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to provide a lightweight portable sunshade, which can be folded up and moved around with a minimum of difficulty.

[0006] It is a further object of this invention to provide a sunshade that can be tilted and rotated at various angles, to block out the sun, and which does not require a large stationary base to support it.

[0007] Other objects of the invention will be realized by reference to the description below.

[0008] In accordance with the above objects and those that will be mentioned and will become apparent below, the portable sunshade in accordance with the present invention comprises a mast structure extending in a generally vertical direction, means for attaching said mast structure at its lower end to a support structure, a boom extending outwardly from the mast structure, having an end movably attached to the mast structure, a hub assembly attached to a second free end of the boom, a plurality of elongated support ribs extending radially from the hub assembly, each support rib having one end rotatably attached to the hub assembly, a canopy positioned over the elongated support ribs and fastened thereto, the canopy having an opening in it corresponding to a predetermined position along the boom, and a boom support strut pivotably attached at one end to the upper end of the mast structure, and at the other end pivotably secured to the boom at a predetermined position along the length of it, the boom support strut extending through the opening in the canopy at the point where it is connected to the boom.

[0009] In one embodiment, the hub assembly comprises two plates substantially parallel and spaced from each other to pivotally sandwich the one end of each support rib whereby each support rib is rotatable with respect to an axis perpendicular to a plane parallel to the plates and thus movable on the plane. The canopy overlying the support ribs is thus collapsed and closed by the movement of the support ribs on the plane.

[0010] In another embodiment of the present invention, the hub comprises a flat crown having a circumference along which radially extending lugs are spaced with notches defined between adjacent lugs to pivotally receive the one end of each support rib. The support rib is thus rotatable about an axis that is on a plane substantially parallel to the crown and movable on a plane substantially normal to the crown, which allows collapse of the canopy spanning the support ribs.

BRIEF DESCRIPTION OF THE DRAWING

[0011] The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof, with reference to the attached drawings, in which:

[0011] FIGURE 1 is a perspective view of a sunshade constructed in accordance with the present invention in an expanded condition;

[0012] FIGURE 2 is a perspective view, partially exploded, of a sunshade constructed in accordance with a first embodiment of the present invention;

[0013] FIGURE 3 is a perspective view of the sunshade of the first embodiment showing a canopy that is supported by a rotatable boom and right side up;

[0014] FIGURE 4 is a perspective view of a frame of the sunshade of the first embodiment of the present invention;

[0015] FIGURE 5 is an exploded view of the frame of FIGURE 4;

[0016] FIGURE 6 is a perspective view showing the sunshade in a collapsed condition;

[0017] FIGURE 7 is a perspective view of a base of the sunshade frame of the present invention;

[0018] FIGURE 8 is an exploded view of the a hub assembly of the sunshade of the first embodiment of the present invention;

[0019] FIGURE 9 is a side elevational view of the hub assembly of the first embodiment of the present invention;

[0020] FIGURE 10 is an exploded perspective view of a mechanism for connecting a boom support strut to a top end of a mast of the sunshade frame;

[0021] FIGURE 11 is an exploded view of a clamping mechanism for positioning the boom on the mast;

[0022] FIGURE 12 is an exploded view of a clamp and safety handle for the mast and base height extension of the sunshade frame of the present invention;

[0023] FIGURE 13 is a perspective view, with parts broken away, showing means for connecting the boom support strut to the boom;

[0024] FIGURE 14 is a perspective view, with parts but away, illustrating telescoping mechanism of a support rib for canopy of the sunshade;

[0025] FIGURE 15 is a cut-away view of the mast of the sunshade of the present invention showing locking means of the mast and trailer hitch vehicle mounting system;

[0026] FIGURE 16 is an exploded view of the locking means for the sunshade to multiple types of base stands;

[0027] FIGURE 17 is a perspective view of a sunshade constructed in accordance with a second embodiment of the present invention;

[0028] FIGURE 18 is a perspective view of a frame of the sunshade of the second embodiment of the present invention;

[0029] FIGURE 19 is an exploded view of the sunshade frame of the second embodiment of the present invention;

[0030] FIGURE 20 is a perspective view, similar to FIGURE 18, but showing canopy support ribs and a hub carrying the canopy support ribs in an rotatable condition, whereas the canopy support not only is able to be angled down or up, but also to be rotated 180 degrees from side to side;

[0031] FIGURE 21 is a cross sectional view of the hub and a runner of the sunshade frame of the second embodiment, showing the canopy support ribs are expanded;

[0032] FIGURE 22 is a cross-sectional view similar to FIGURE 21 but showing the canopy support ribs are collapsed;

[0033] FIGURE 23 is a perspective view showing a different embodiment of the base of the present invention;

[0034] FIGURE 24 is a perspective view showing that the base in Fig. 23 is folded so that the size thereof is compact; and

[0035] FIGURE 25 is a perspective view showing still another embodiment of the base of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0036] With reference to the drawings and in particular to Figure 1 of the drawings, a portable sunshade constructed in accordance with the present invention, generally designated with reference numeral 10, comprises a frame (not labeled) for supporting a canopy 102 that is collapsible as illustrated in FIGURE 6. The sunshade frame comprises a base member 12 on which a mast is mounted for movably supporting a boom 24 and a boom support strut 68 that carries a hub mechanism 48 and a plurality of canopy support ribs 62 (particularly shown in FIGURE 8) on which the canopy 102 overlies.

[0037] Also referring to FIGURE 7, the base member 12 comprises a U-shaped base support frame 120 having spaced limbs (not labeled) between which a lower end of a tubular vertical column 122 is mounted by a bolt 124 which extends through the limbs of the U-shaped frame 120, through spacers 125 separating the limbs of the U-shaped frame 120 from the lower end of the column 122, and through the column 122. The U-shaped frame 120 is rotatable around a horizontal axis defined by the bolt 124 to allow the stand to be folded flat.

[0038] A slidable collar 126 is fitted around to the column 122 at a short distance from the lower end of the column 122. The collar 126 has ears 128, which extend outward on each side, defining aligned through holes (not shown) for the extension of a bolt (not shown). A pin 1261 secures the collar 126 in place on the column 122.

[0039] A pair of support struts 132 connects the collar 126 to the U-shaped frame 120. The support struts 132 are connected, respectively, to the limbs of the U-shaped frame 120 by bolts 134, which extend through the limbs and the struts 132. The struts 132 are rotatable about the bolts 134. Means is employed to prevent the collar 126 from moving upward as pressure is placed thereon by the weight of the sunshade. An example is a slip pin (not shown) extending through holes defined in both the column 122 and the collar 126.

[0040] Thus, the U-shaped frame 120 can be folded up against the column 122 by disabling the means that is employed to prevent the collar 126 from moving

upward to loosen the collar 126, and allowing the collar 126 to move to a higher position on the column 122.

[0041] The U-shaped base support frame 120 should be sufficiently strong so as to support for example the weight of an automobile or other vehicle when the wheels of the automobile are resting on the frame 120, which is used to provide stability for the sunshade 10.

[0042] The U-shaped base support frame 120 can be made of any material, such as iron, steel, and aluminum, but should be sufficiently sturdy that the frame 120 does not bend, deform, or even break when the wheels of the automobile are resting thereon, yet light enough to ensure easy transportation. The column 122 can also be fabricated of iron, steel, or aluminum, but it too, should be sufficiently sturdy so as not to break or bend due to the weight of or forces brought to bear by the rest of the sunshade 10.

[0043] Also referring to FIGURES 2-5, the mast 20 is telescopically mounted on the tubular column 122 of the base 12. The external diameter of the mast 20 is slightly less than the internal diameter of the tubular column 122 so that the lower end of the mast 20 securely fits into and is slidable within the column 122. A main mast 22 is telescopically fitted over the mast 20. The internal diameter of the main mast 22 is slightly larger than the external diameter of the mast 20 so that the main mast 22 can slide up and down on mast 20 as adjustments are made in its height. A clamp 154 selectively fixes the position of the main mast 22 on the mast 20. This will be further described. The mast 20 has a keyway installed along a length of inner periphery of the mast 20 and the main mast 22 has a key installed along a length of the main mast 22 such that after the main mast 22 is inserted into the mast 20, the corresponding between the key and keyway is able to prevent relative rotation movement between the main mast 22 and the mast 20.

[0044] The mast 20 and main mast 22 can be made of any suitable material, such as iron, steel, plastic composite materials and aluminum, but aluminum is preferred because of light weight and durability.

[0045] Also referring to FIGURE 11, a sliding mast clamp 26 attaches a proximal end of the boom 24 to the main mast 22. The mast clamp 26 comprises a

collar fitting around the main mast 22. The mast clamp 26 consists of opposing plates 28, 30, each of which is shaped, in an inner surface, to conform to the outer surface of the main mast 22. The plates 28, 30 are connected together by a web 31 at one end and spaced apart from each other at the other end by a slit 33 whereby the main mast 22 is received between the plates 28, 30. Each plate 28, 30 has an ear extension 32, 34, that projects horizontally away from the main mast 22. The ear extensions 32, 34 are spaced from each other and defines a space therebetween. The plates 28, 30 define aligned through holes 36 for the extension of compression bolts 37 from opposite directions.

[0046] The opposing plates 28, 30 are tightened around the main mast 22 by compression nut knob handles 40, which are threaded around the projecting ends of the compression bolts 37. The plates 28 and 30 are drawn toward each other as the knobs 40 are tightened thereby securely fixing the mast clamp 26 on the main mast 22. The position of the mast clamp 26 on the main mast 22 can thus be adjusted by moving the mast clamp 26 up or down along the mast 22 and tightening the compression bolts 37 with the knobs 40 when the desired position is achieved.

[0047] The ears 32, 34 also have holes 38 defined therein and aligning with each other for the extension of a bolt 42. This will be further described.

[0048] The boom 24 is pivotably affixed to the mast clamp 26 by fitting the proximal end thereof into a collar 96 comprising opposing plates 98, 100. The collar 96 fits in the space between the opposing ears 32, 34 of the plates 28, 30 of the mast clamp 26. The opposing plates 98, 100 of the collar 96 are drawn together by opposed compression bolts 43 extending through the plates 98, 100 and threadingly engaging with and tightened by compression bolt tightening knobs 44. Inside surfaces of the plates 98, 100 are shaped so as to conform to outer surface of the boom 24.

[0049] The bolt 42 extends through the holes 38 defined in the ears 32, 34 of the mast clamp 26 and through holes 95 defined in the collar 96, securing the collar 96 in place and allowing the collar 96 and thus the boom 24 to pivot about the bolt 42 with respect to the main mast 22 in a vertical direction. A nut 46 secures the bolt 42 and thus fixes the boom 24 to the main mast 22. Preferably, washers 45 are sandwiched between the collar 96 and nut 46 and a head of the bolt 42. The collar 96 is thus

rotatably fixed between the opposing ears 32, 34 of the mast clamp 26. Thus the boom 24 is rotatable around a horizontal axis, and pivotable with respect to the main mast 22 in a vertical direction.

[0050] The boom 24 can be rotated about an axis thereof by loosening the knobs 44 on the compression bolts 43. After the boom 24 is rotated to the desired degree, the knobs 44 are tightened again, fixing the boom 24 in its new position.

[0051] As best seen in FIGURES 4, 5, 8 and 9, a hub mechanism 48 is attached to a distal free end of the boom 24. The hub mechanism 48 consists of two opposing triangular shaped angled plates 50, 52, each defining a plurality of holes 54. Each of the plates 50 and 52 are bent at an angle at a point approximately one-third distance from the apex, at that apex where the distal end of the boom 24 is fastened. The angle is approximately 15 degrees. The holes 54 in the plate 50 are aligned with the holes 54 in the plate 52, when the plates 50 and 52 are aligned with each other. The plates 50 and 52 are separated, or spaced apart by a plurality of rotating rib plugs 56, each of which defines a bore 58 extending in a vertical direction.

[0052] As seen in FIGURE 5, each rib plug 56 has a cylindrical projection 60 extending outwardly from the side thereof. The projections 60 serve to receive proximal ends of cylindrical canopy support ribs 62 that extend radially outwardly from the hub mechanism 48. The support ribs 62 are tubular, and the proximal end of each rib 62 fits over the corresponding projection 60. Thus, the support ribs 62 are movable to some extent with regard to the projections 60.

[0053] The plates 50, 52 are secured to each other by means of bolts 64, which extend through the holes 54 in both plates 50, 52 and through the bores 58 in the rib plugs 56. The bolts 64 are secured by nuts (not shown). Thus the rib plugs 56 are secured between the plates 50 and 52, but are free to rotate about a vertical axis defined by the bolts 64.

[0054] The distal end of the boom 24 is fixed between the plates 50, 52 by means of the bolts 64 extending through holes 54 defined in the plates 50, 52 and corresponding holes 66 defined through the distal end. The bolts 64 may be secured in position by nuts (not labeled but shown in FIGURE 9).

[0055] The boom support strut 68 is pivotably connected at a proximal end thereof to the main mast 22 and pivotably connected at a distal end thereof to the boom 24, at a point which is intermediate the point of attachment of the boom 24 to the main mast 22, and the hub mechanism 48. Preferably, the boom support strut 68 is attached to the boom 24 at a point at least half of the length thereof.

[0056] As seen in FIGURE 10, the boom support strut 68 is pivotably connected to the main mast 22 by means of a rotating strut collar 70 having extended ears 72, which fits around the main mast 22. The ears 72 define aligned holes 74. A proximal end of the boom support strut 68 is received between the ears 72 of the collar 70. A bolt 76 extends through the holes 74 of the ears 72 and through holes 78 in the proximal end of the boom support strut 68. A saddle 79 is positioned on each side of the support strut 68; intermediate it and the ears 72, to provide lateral support. Thus the strut 68 is pivotable in a vertical direction about a horizontal axis defined by the bolt 76.

[0057] The collar 70 is secured to a top end of the main mast 22 by means of a rotating cap flange 80 through which an eyebolt 82 is threaded. The eye of the eyebolt 82 is held in place at the top of the main mast 22 by a bolt 84 which extends through holes defined in the main mast 22 through the eye of the eye bolt 82, and is secured by a nut 86.

[0058] As seen in FIGURE 13, a distal end of the boom support strut 68 is pivotably secured to the boom 24 by a rotating boom collar 88 which has ears 90 extending from opposite sides thereof. The ears 90 defines aligned holes, as does the distal end of the boom support strut 68 (both not shown). A bolt and nut combination 92 extends through the holes in the ears 90 and the boom support strut 68 and pivotably secures the boom support strut 68 to the boom 24.

[0059] Bolts secured by nuts 94 placed through holes (not shown) in the boom 24 on each side of the boom collar 88 hold the boom collar 88 in place on the boom 24. Thus the boom collar 88 is free to rotate around the boom 24 but is not allowed to move along the boom 24.

[0060] As seen best in FIGURE 14, the support ribs 62 are telescoping ribs, and have an inner rib section 63 which telescopes within the support rib 62, and which can

be extended and fixed at a desired position by spring loaded buttons 65 affixed to the rib sections 63, which pop out of holes (not shown) in the support rib 62.

[0061] A canopy 102 spans the support ribs 62, which, when extended, extend radially from the hub mechanism 48. As shown in FIGURES 1-3, the canopy 102 is rectangular in shape, but the shape is not critical. That is, it can be round, oval, square, rectangular, etc. The support ribs 62 can be adjusted to accommodate any shape of canopy. It can be made out of any suitable material, although waterproof canvas is preferred. The canopy 102 has a slot 104 cut in it through which the boom support strut 68 passes from its point of connection to the main mast 22, to the point of connection on the boom 24.

[0062] Pockets 106 are sewn into the underside of the canopy 102, and are adapted to receive distal ends 63 of the support ribs 62, after the support ribs 62 are radially extended from the hub mechanism 48. The pockets 106 are formed of a piece of fabric, which is sewn to the underside of the canopy 102.

[0063] Thus, the ribs 62 are secured to the hub mechanism 48 at their near ends and to the canopy 102 by the pocket enclosures 106 at their far ends.

[0064] The canopy 102 of the sunshade 10 can be raised or lowered, and its angle in relation to the sun changed, by raising or lowering the sliding mast clamp 26 attached to the main mast 22, and by pivoting and/or rotating the boom 24. As seen in FIGURE 6, when the mast clamp 26 is lowered to the lowest point on the mast 22, the portable sunshade 10 folds itself up, and is easily transportable. The relational aspect of the support ribs 62 to the boom 24 enable the support ribs 62 to be rotated so that the ribs 62 are aligned in parallel to each other and to the boom 24, thus permitting the entire canopy 102 to be folded into a compact package.

[0065] Another embodiment of the hub mechanism in accordance with the present invention is shown in FIGURES 17-20. As shown, the hub mechanism, which is designated with reference numeral 300, comprises a disk like crown 302 having a circumference along which pairs of lugs 304 are formed and spaced from each other. Each pair of lugs 304 defines a space therebetween for receiving the proximal end of each support rib 62. The proximal end of the support rib 62 is pivoted to the lugs 304 by a pivot pin 306 whereby the support rib 62 is rotatable

about a horizontal axis in a vertical direction with respect to the crown 302. A central column 308 is fixed to the crown at an upper end thereof and has a free lower end. The distal end of the boom 24 is coupled to the crown 302 by being fixed between lugs of the crown 302 whereby the crown 302 and the support ribs 62 are supported in position by the boom 24.

[0066] A runner 310 comprises a disk like member 312 having a circumference along which pairs of lugs 314 are formed and spaced from each other. Each pair of lugs 314 defines a space therebetween for receiving an end of a stretcher 316 which is pivotally mounted to the lugs 314 by a pivot pin 318. A central column 320 is mounted to and extends from the runner disk member 312. The crown 302 and the runner 310 are arranged so that the central columns 308, 320 are substantially coaxially aligned with and extending toward each other. A canopy control cable 322 is coupled between the runner 310 and the crown 302 for driving the runner 310 with respect to the crown 302. This will be further discussed.

[0067] The stretcher 316 has a distal end pivoted to the support rib 62. A rib collar 324 is fit over and fixed to each support rib 62 and has ears 326 defining a space therebetween for receiving the distal end of the support rib 62 in a pivoting manner.

[0068] A runner support strut 328 has a distal end coupled to the runner 310 by being fixed between lugs of the runner 310 and a proximal end coupled to the boom 24 by a second boom collar 330. The boom collar 330 is rotatably and slidably fit over the boom 24 and has ears 332 defining a space therebetween for receiving the proximal end of the runner support strut 328 in a pivoting manner. The second boom collar 330 has a structure similar to the boom collar 88 whereby no more description is necessary. However, it is noted that the second boom collar 330 is not allowed to move or rotate around the boom 24 once the second boom collar 330 is fixed on the boom 24.

[0069] Also referring to FIGURES 21 and 22, the canopy control cable 322 has a first end fixed to the crown 302, extends to the runner 310 inside the columns 308, 320, wraps around a runner pulley 334 arranged inside the column 320 of the runner 310, then goes upward to the crown 302 and wraps around a second pulley 336 arranged inside the column 308 of the crown 302. The cable 322 extends out of the

crown 302 and enters the boom 24 by being redirected by a third pulley 338. By tightening and loosening the cable 322, the runner 310 is driven toward/away from the crown 302, which causes the stretchers 316 to erect up and fold the support ribs 62 and the canopy 102 overlying the support ribs 62 is in turn expanded and folded up.

[0070] Referring to Fig. 12, the clamp 154 that connects the main mast 22 to the lower mast 20 of the sunshade 10 comprises a block 156 having pairs of upper and lower ears 158, 160, which project outwardly. The clamp 154 is tightened around the masts 22, 20 by means of compression screws 159 extending through opposing ears 158 (160), and which are tightened by means of the knobs 162 affixed to the compression screws 159. As the knobs 162 are tightened around the compression screws 159, the ears 158, 160 are drawn closer to each other around the masts 22, 20, and fixes the masts 22, 20 in position, thereby allowing telescoping height adjustment of the sunshade 10. The mast 20 has a keyway installed along a length of inner periphery of the mast 20 and the main mast 22 has a key installed along a length of the main mast 22 such that after the main mast 22 is inserted into the mast 20, the corresponding between the key and keyway is able to prevent relative rotation movement between the main mast 22 and the mast 20.

[0071] A protection lever 350 is pivotally attached to the clamp 154 and driven by spring 352 to bias a lower tip 354 of the lever 350 inward. Thus, when the masts 22, 20 are shortened by telescoping, the tip 354 of the lever 350 engages a circumferential shoulder 356 formed on around a top end of the vertical column 122 of the base member 12 to prevent direct engagement between the clamp 154 and the shoulder 356 thereby offering protection to an operator's fingers.

[0072] As seen in FIGURES 15 and 16, the sunshade mast 20 is also locked in place by means of a lock-hook lever 164, which is biased by a spring 165 to rotate around a bolt 166 extending through the mast 20. The lever 164 is attached to a rope 168 which extends up through the interior cavities of the mast 20 and main mast 22, over a pulley 170 mounted at the upper end of the main mast 22, thence through a hole 174 in the main mast 22, to the outside. The lower end of the mast 20 is notched 176, and thus fits over a pin 178 extending through the column 122 of the base member 12. When the mast 20 is lowered into place in the column 122 of the

base member 12, the lever 164 engages the pin 178, and the mast 20 is thus locked into position.

[0073] When it is desired to remove the sunshade, the rope 168 is pulled from the outside and the lever 164 is rotated around the bolt 166, and disengages. The mast 20 and the balance of the sunshade 10 can then be removed, and retracted through telescoping action.

[0074] With reference to Fig. 23, it is to be noted that the base 12a of the present invention may be configured to have four limbs 121a spaced apart from each other by 90 degrees and pivotally connected to each other and four arms 122a each pivotally sandwiched between the slidable collar 126 and a corresponding one of the limbs 121a. Weights 123a are provided between two adjacent limbs 121a to secure relative position of each of the limbs 121a and to secure the base 12a. It is seen from Fig. 24 that after the weights 123a are removed, the limbs 121a are able to be folded toward the slidable collar 126 so that the sunshade of the present invention is compact in size.

[0075] With reference to Fig. 25, the base 12b is configured to have a base plate 121b with a supporting tube 122b securely formed on a top face of the base plate 121b and having a through hole 1221 defined through the supporting tube 122b to correspond to a bulb-nut combination 123b. The column 122 is provided with a securing hole 1222 corresponding to the through hole 1221 of the supporting tube 122b. Therefore, when the column 122 is inserted into the supporting tube 122b to align the securing hole 1222 and the through hole 1221 of the column 122, the bulb-nut combination 123b is able to secure the relative position of the column 122 and the supporting tube 122b.

[0076] It will be apparent to those skilled in the art that various modifications can be made in the sunshade of this invention, yet will be within the spirit and scope of the invention, being limited solely by the appended claims.